

Floods, Droughts and Trends in Hydrology for 2013

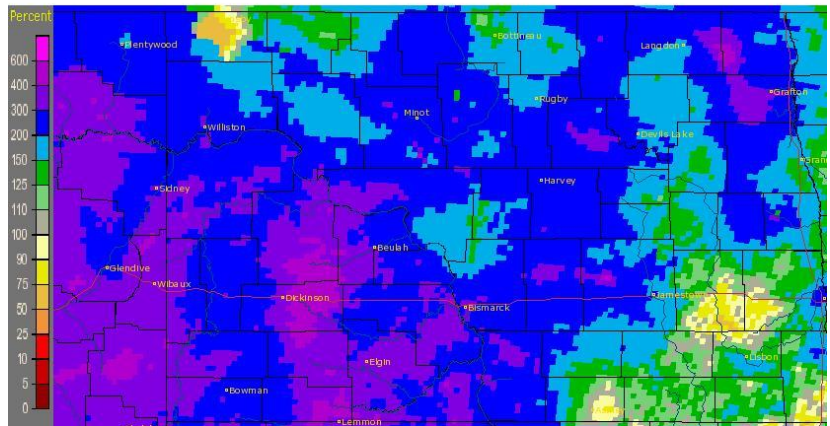
Those interested in all things related to hydrology have found the past 6 months quite the roller coaster ride. This spring again saw fairly significant runoff in the Red, James, and Souris River basins. Albeit, much of this spring's flooding was significantly mitigated by a very slow melt on top of dry and warm soils in the Red River Valley and James River basin. April's rainfall across the Souris was much less than normal and also helped minimize spring flooding.

Fast forward to May, the AHPS precipitation maps to the right show a very different pattern emerged in early summer where the southwestern corner of the state became unusually wet and a prolonged dry period began in the southeast.

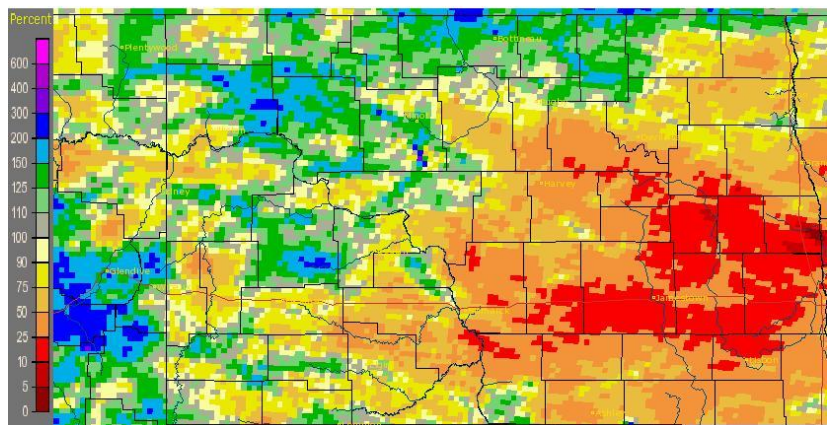
The rapid change in precipitation patterns cannot be overstated when it comes to agriculture. Unlike the more common small grains out west, which depend heavily on late May through early July rains, late June through August is the make or break time for row crops in the east when it comes to yield and quality. Regrettably, July (as shown to the right) was much like June and August where orange and red represent much below normal rain across a large area.

Finally, as one follows the progression of images on the right, the very last one shows a notable improvement in rainfall over the past 30 days.

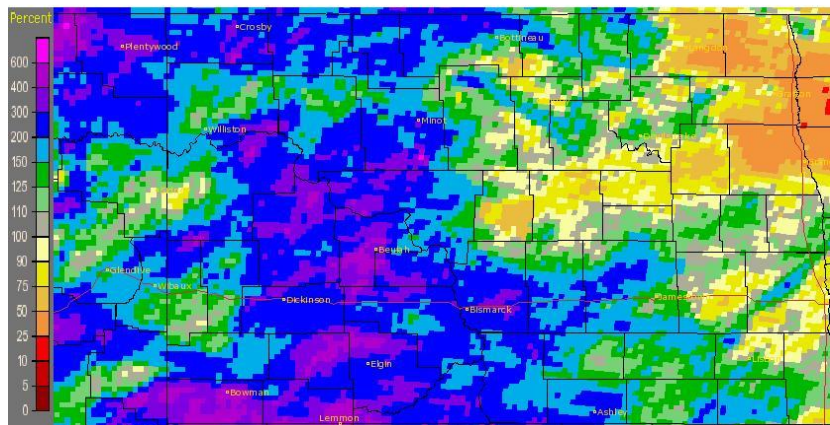
Bismarck, ND (BIS): May, 2013 Monthly Percent of Normal Precipitation
Valid at 6/1/2013 1200 UTC- Created 6/18/13 4:58 UTC



Bismarck, ND (BIS): July, 2013 Monthly Percent of Normal Precipitation
Valid at 8/1/2013 1200 UTC- Created 8/16/13 5:22 UTC



Bismarck, ND (BIS): Current 30-Day Percent of Normal Precipitation
Valid at 9/24/2013 1200 UTC- Created 9/25/13 0:07 UTC



Using the statistical breakdown for these critical months, we can determine how often this type of precipitation pattern affects North Dakota.

While North Dakota has a known difference in average annual precipitation where the east is generally wetter than the west, we can use NWS data for the Bismarck area as a proxy for the state.

Precipitation Statistics for Bismarck Area (1874 to Present) as inches of water.

Month	Average (Mean)	50 th Percentile (Median)	10 th Percentile	25 th Percentile	75 th Percentile	% of time below Average
May	2.30	2.02	0.76	1.13	3.04	56
June	3.23	2.92	1.23	2.02	4.15	56
July	2.35	2.09	0.80	1.30	3.14	59
August	1.89	1.58	0.43	0.87	2.59	62

One of the interesting things we can glean from the above table is that the median is universally lower than the average by over a quarter inch of rain. This tells us that, as the last column shows, over half of the time we are below the much used “normal” we all hear about for a given month. Not only does this hold true for every month in the table, but as the summer progresses, the frequency of below normal precipitation actually increases. Statistically speaking this is easy to explain; while it is impossible to receive a negative amount of rain on the lower end of observed values, the upper end is theoretically unlimited and that skews the average (mean) to be universally higher than the median. Thus a few remarkably wet years exert a stronger effect on the average than a similar number of years with near zero rainfall during a given month.

All the above brings us to what we already know, North Dakota is climatologically defined as a land of extremes. Over the course of a few months it is not uncommon for North Dakota to go from flooding to drought. The above helps us understand how we can go from flooding to having a widespread drought designation over the course of just a few months.

A key thing to note, though, is that the drought has thus far been short-term with impacts primarily centered on agriculture. No water shortages, abnormally low streamflow, or water availability related restrictions are in place. Thus far, the only water restrictions put in place are related to water treatment plant capacity being exceeded as dry weather encouraged more lawn watering.

U.S. Drought Monitor

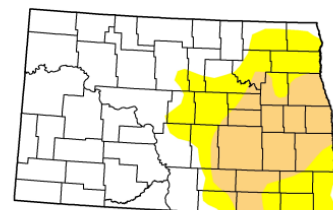
September 17, 2013
Valid 7 a.m. EST

North Dakota

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	60.75	39.25	18.93	0.00	0.00	0.00
Last Week (09/10/2013 map)	54.03	45.97	27.36	3.80	0.00	0.00
3 Months Ago (06/18/2013 map)	90.28	9.72	0.00	0.00	0.00	0.00
Start of Calendar Year (01/01/2013 map)	11.09	88.91	54.98	30.51	0.00	0.00
Start of Water Year (09/25/2012 map)	0.00	100.00	94.90	28.49	4.78	0.00
One Year Ago (09/11/2012 map)	0.00	100.00	80.41	28.34	0.00	0.00

Intensity:

D0 Abnormally Dry	D3 Drought - Extreme
D1 Drought - Moderate	D4 Drought - Exceptional
D2 Drought - Severe	



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>



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National Drought Mitigation Center,